

Figure 1



Figure 2

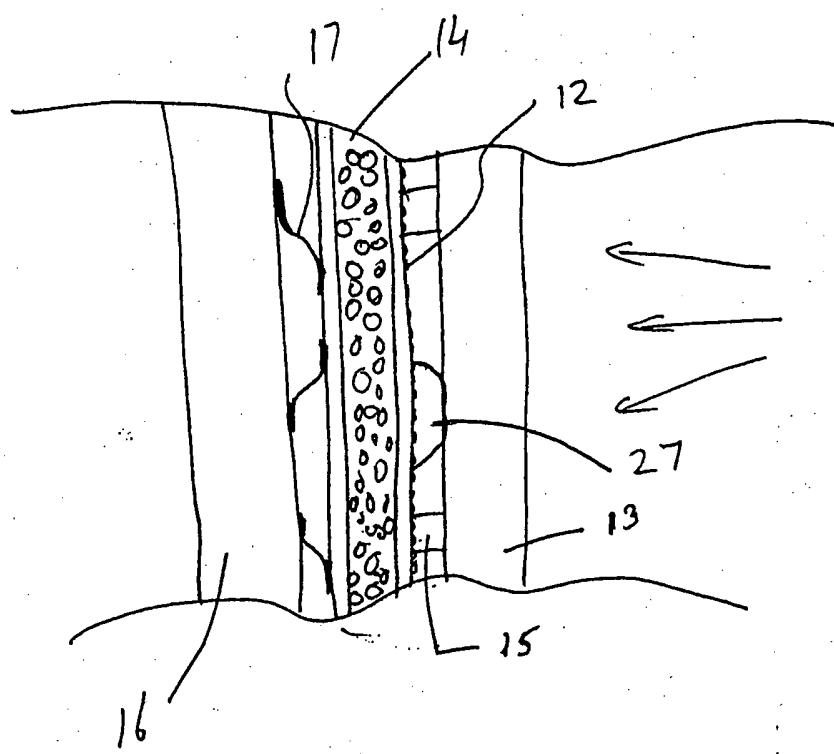
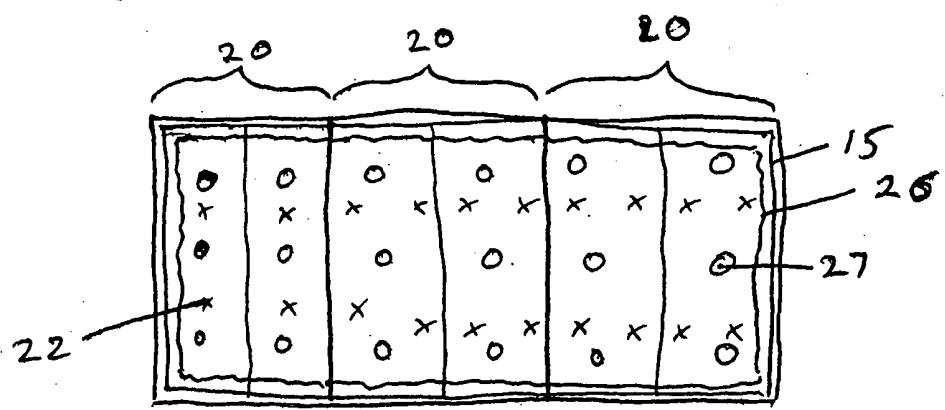
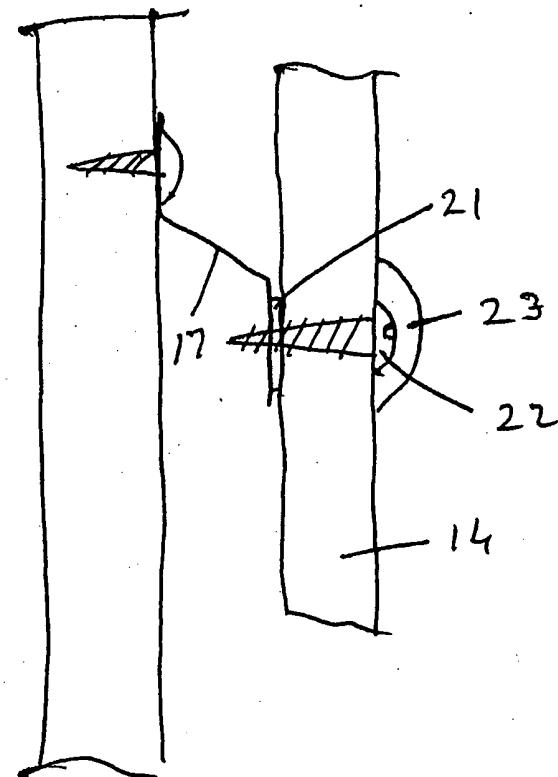
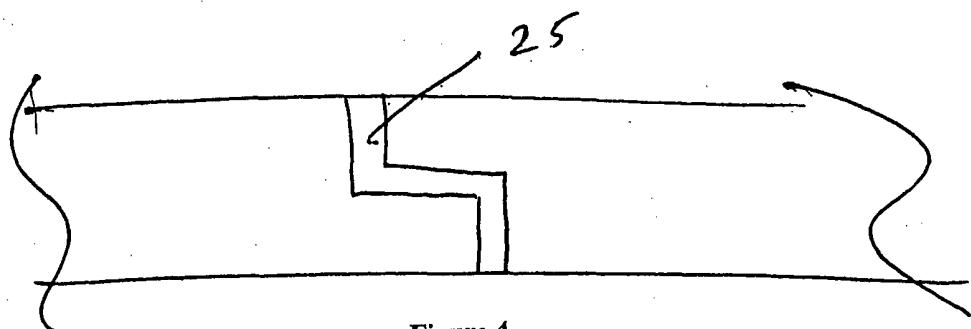


Figure 3



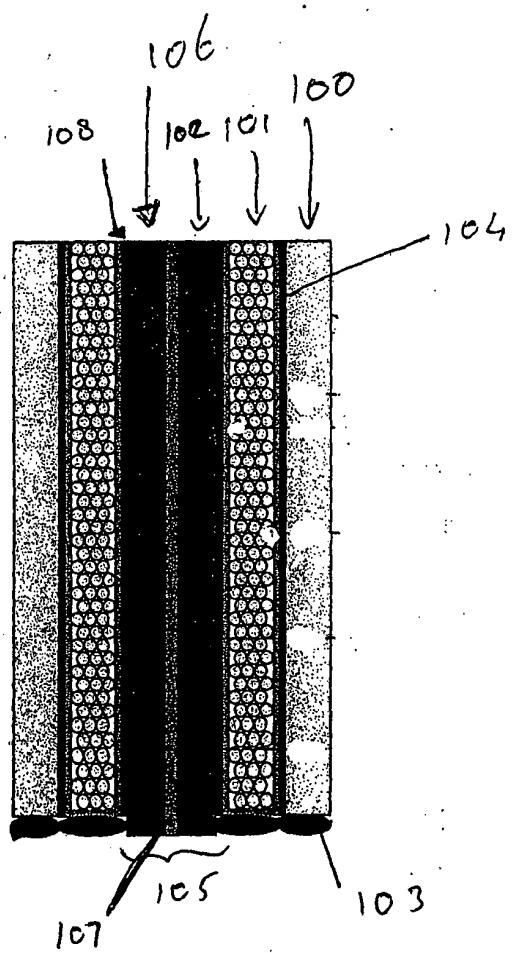


Fig 7

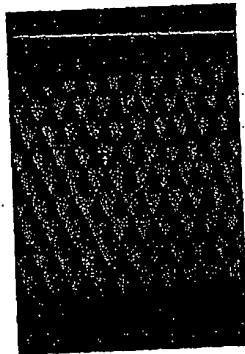


Fig 8

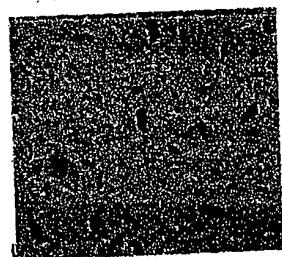


Fig 9

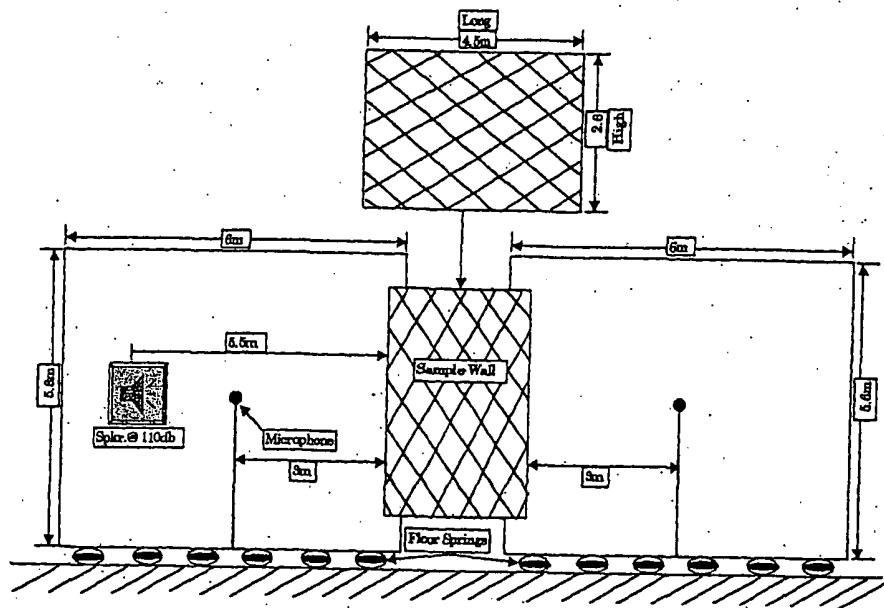


Fig 10

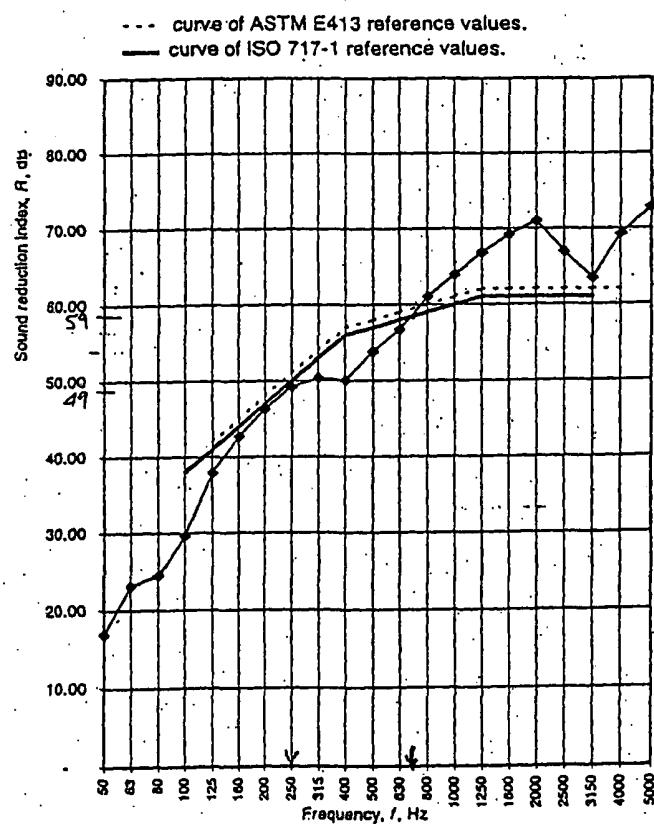


Fig 11

Airborne sound reduction indices according to ISO 140-3 Laboratory measurements of airborne sound insulation of building elements																																														
Client: UNITEC	Date of test: 11-Sep-01	Test rooms: Reverberation Chambers A and C																																												
<u>Description and identification of the test specimen and test arrangement:</u> A 2650mm high and 4510mm long wall with a single-stud frame made from 90mmx45mm pinus radiata kiln-dried timber. Frame consists of three subframes joined length-wise, which are 2640mm high (1st subframe is 880mm long, 2nd subframe 1800mm long, 3rd subframe 1823mm long); studs of frames are at 600mmCTRS, and Dwangs are at 650mmCTRS. Gib Rondo Resilient Rail at 600mmCTRS is screw-fixed to timber through 4mm thick rubber pads on one side of frame (chamber C-side); the resilient rail is fixed upside-down so that outer edge is upper-most. Both sides have 1 inner layer of 13.0 mm custom 'UNITEC Acoustic Liner', with the dimpled surfaces towards source chamber C; inner layer joins are sealed with acoustic sealant. Both sides have 1 outer layer of 13mm Standard GIB board. Inner and outer layers are separated with horizontal strips of 10x4mm thick medium density foam at 600mmCTRS; perimeter of wall also has the same foam separating strips. Outer GIB board layers are spot-glued at 300mmCTRS to inner layers and screw-fixed through the foam separating strips at 300mmCTRS. Frame is infilled with 1 layer of 75mm Autex GreenStuf R1.8 polyester fibre infill. Edge of wall sealed to chamber with acoustic sealant (GIB SoundSeal). Source chamber was Chamber C and receiving chamber was Chamber A. Test specimen was installed by client. Computer Files: P0018-1, L0018-1, B0018-1.																																														
Area $S$ of test specimen: 11.95 $m^2$	Air temp in the test rooms: 14 °C	--- curve of ASTM E413 reference values.																																												
Air humidity in test rooms: 60 %	Source room volume: 208 $m^3$	— curve of ISO 717-1 reference values.																																												
Receiving room volume: 202 $m^3$																																														
<table border="1"> <thead> <tr> <th>Frequency / Hz</th> <th><math>R</math> One-third octave dB</th> </tr> </thead> <tbody> <tr><td>50</td><td>16.9</td></tr> <tr><td>63</td><td>23.1</td></tr> <tr><td>80</td><td>24.5</td></tr> <tr><td>100</td><td>29.6</td></tr> <tr><td>125</td><td>37.9</td></tr> <tr><td>160</td><td>42.7</td></tr> <tr><td>200</td><td>46.3</td></tr> <tr><td>250</td><td>49.2</td></tr> <tr><td>315</td><td>50.4</td></tr> <tr><td>400</td><td>50.0</td></tr> <tr><td>500</td><td>53.8</td></tr> <tr><td>630</td><td>56.7</td></tr> <tr><td>800</td><td>61.0</td></tr> <tr><td>1000</td><td>63.9</td></tr> <tr><td>1250</td><td>66.8</td></tr> <tr><td>1600</td><td>69.2</td></tr> <tr><td>2000</td><td>71.0</td></tr> <tr><td>2500</td><td>66.9</td></tr> <tr><td>3150</td><td>63.4</td></tr> <tr><td>4000</td><td>69.2</td></tr> <tr><td>5000</td><td>72.8</td></tr> </tbody> </table>			Frequency / Hz	$R$ One-third octave dB	50	16.9	63	23.1	80	24.5	100	29.6	125	37.9	160	42.7	200	46.3	250	49.2	315	50.4	400	50.0	500	53.8	630	56.7	800	61.0	1000	63.9	1250	66.8	1600	69.2	2000	71.0	2500	66.9	3150	63.4	4000	69.2	5000	72.8
Frequency / Hz	$R$ One-third octave dB																																													
50	16.9																																													
63	23.1																																													
80	24.5																																													
100	29.6																																													
125	37.9																																													
160	42.7																																													
200	46.3																																													
250	49.2																																													
315	50.4																																													
400	50.0																																													
500	53.8																																													
630	56.7																																													
800	61.0																																													
1000	63.9																																													
1250	66.8																																													
1600	69.2																																													
2000	71.0																																													
2500	66.9																																													
3150	63.4																																													
4000	69.2																																													
5000	72.8																																													
Notes: #N/A = Value not available. Bold values are used to calculate STC and $R_w$ .																																														
Rating according to ISO 717-1 $R_w(C;C_w) = 57(-2; -9)$ dB																																														
$C_{50-3150} = -6$ dB $C_{50-3150} = -18$ dB	$C_{315-5000} = -5$ dB $C_{315-5000} = -18$ dB	$C_{100-5000} = -1$ dB $C_{100-5000} = -9$ dB																																												
Rating according to ASTM E413 -87 Sound Transmission Class = 58 dB																																														
Evaluation based on laboratory measurement results obtained by an engineering method.																																														
No. of test report: T0118	Name of test institute: University of Auckland Acoustics Testing Service.																																													
Date: 26 <sup>th</sup> Sept 2001	Signature: G.W. Emms																																													

Figure 12

Airborne sound reduction indices according to ISO 140-3 Laboratory measurements of airborne sound insulation of building elements																																															
Client: Unitec	Date of test: 8-Feb-02	Test rooms: Reverberation Chambers A and C																																													
Description and identification of the test specimen and test arrangement: 2 Layers of 75x50mm H1 Timber framing Studs @ 600mm CTRS (5mm between layers), Nogs @ 800mm CTRS. 75mm Green Stuff insulation infill, One layer 12.5mm Prismatic board (Unitec Specifications) and one layer 13mm Gib Noiseline each side. Linings screw fixed @ 300mm CTRS. Lamination foam strips between layers as spacer. Outer lining layer glued over entire area but screwed only at perimeter. Stopped and taped with 90min trade-set bedding compound.																																															
Source chamber was Chamber C and receiving chamber was Chamber A. Test specimen was installed by client. Curing time was 19 hours. Computer Files: U0201-1 L0201-1 R0201-1 S0201-1																																															
Area S of test specimen: 12.09 m <sup>2</sup>	Air temp in the test rooms: 24 °C	--- curve of ASTM E413 reference values. — curve of ISO 717-1 reference values.																																													
Air humidity in test rooms: 49 %	Source room volume: 209 m <sup>3</sup>																																														
Receiving room volume: 202 m <sup>3</sup>																																															
<table border="1"> <thead> <tr> <th>Frequency / Hz</th> <th>R One-third octave dB</th> </tr> </thead> <tbody> <tr><td>50</td><td>27.5</td></tr> <tr><td>63</td><td>36.2</td></tr> <tr><td>80</td><td>35.3</td></tr> <tr><td>100</td><td>40.6</td></tr> <tr><td>125</td><td>47.6</td></tr> <tr><td>160</td><td>49.7</td></tr> <tr><td>200</td><td>51.0</td></tr> <tr><td>250</td><td>52.4</td></tr> <tr><td>315</td><td>51.7</td></tr> <tr><td>400</td><td>54.5</td></tr> <tr><td>500</td><td>57.9</td></tr> <tr><td>630</td><td>61.1</td></tr> <tr><td>800</td><td>65.1</td></tr> <tr><td>1000</td><td>68.3</td></tr> <tr><td>1250</td><td>71.4</td></tr> <tr><td>1600</td><td>73.0</td></tr> <tr><td>2000</td><td>73.5</td></tr> <tr><td>2500</td><td>68.9</td></tr> <tr><td>3150</td><td>71.8</td></tr> <tr><td>4000</td><td>&gt; 76.7</td></tr> <tr><td>5000</td><td>&gt; 77</td></tr> </tbody> </table>				Frequency / Hz	R One-third octave dB	50	27.5	63	36.2	80	35.3	100	40.6	125	47.6	160	49.7	200	51.0	250	52.4	315	51.7	400	54.5	500	57.9	630	61.1	800	65.1	1000	68.3	1250	71.4	1600	73.0	2000	73.5	2500	68.9	3150	71.8	4000	> 76.7	5000	> 77
Frequency / Hz	R One-third octave dB																																														
50	27.5																																														
63	36.2																																														
80	35.3																																														
100	40.6																																														
125	47.6																																														
160	49.7																																														
200	51.0																																														
250	52.4																																														
315	51.7																																														
400	54.5																																														
500	57.9																																														
630	61.1																																														
800	65.1																																														
1000	68.3																																														
1250	71.4																																														
1600	73.0																																														
2000	73.5																																														
2500	68.9																																														
3150	71.8																																														
4000	> 76.7																																														
5000	> 77																																														
<p>Notes: #N/A = Value not available. Bold values are used to calculate STC and <math>R_{w0}</math>.</p>																																															
<p>Rating according to ISO 717-1</p> $R_w(C; C_w) = 62 (-1; -6) \text{ dB}$ <table> <tr> <td><math>C_{30-3150} = -3 \text{ dB}</math></td> <td><math>C_{30-5000} = -2 \text{ dB}</math></td> <td><math>C_{100-5000} = 0 \text{ dB}</math></td> </tr> <tr> <td><math>C_{w,30-3150} = -13 \text{ dB}</math></td> <td><math>C_{w,30-5000} = -13 \text{ dB}</math></td> <td><math>C_{w,100-5000} = -6 \text{ dB}</math></td> </tr> </table>				$C_{30-3150} = -3 \text{ dB}$	$C_{30-5000} = -2 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$	$C_{w,30-3150} = -13 \text{ dB}$	$C_{w,30-5000} = -13 \text{ dB}$	$C_{w,100-5000} = -6 \text{ dB}$																																						
$C_{30-3150} = -3 \text{ dB}$	$C_{30-5000} = -2 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$																																													
$C_{w,30-3150} = -13 \text{ dB}$	$C_{w,30-5000} = -13 \text{ dB}$	$C_{w,100-5000} = -6 \text{ dB}$																																													
<p>Rating according to ASTM E413 -87</p> <p>Sound Transmission Class = 63, dB</p>																																															
<p>Evaluation based on laboratory measurement results obtained by an engineering method.</p>																																															
No. of test report: T0201	Name of test institute: University of Auckland Acoustics Testing Service.																																														
Date: 13/2/2002	Signature:																																														

Fig 13